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10/537,674	06/06/2005	Chris Wyland	US02 0511 US	5157

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EXAMINER

RODELA, EDUARDO A

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 09/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/537,674	Applicant(s) WYLAND, CHRIS	
	Examiner Eduardo A. Rodela	Art Unit 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.


Minhloan Tran
Primary Examiner
Art Unit 2826

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 June 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the remarks filed June 27, 2006.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the

- a. "ball grid array" of claim 18,
- b. "bonding remaining signal, power and **ground** pads of the device die to ball grid array package landings" of claim 18,

...must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim language states in the specification, lines 19-26, that bonding pads 125 of Figures 2 and 2A are signal pads. The claim language states, "bonding a ground strap to the device die ground pads" and also "bonding remaining signal, power, and ground pads of the device die to ball grid array package landings". This is unclear since the first recitation from the claim above states that a bonding strap is bonded to all of the device die ground pads and then further in the claim, there are extra grounding pads which are bonded in presumably different fashion such as wire bonding.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 18 is rejected under 35 U.S.C. 102(e) as being anticipated by Huang et al. (US 6,667,546).

Regarding claim 18, as it is understood by the examiner, Huang et al. disclose in Figures 1-2B, a method for controlling impedance of bond wires in packaging a semiconductor device die in a ball grid array package, the method comprising:

defining locations of signal [212] and power [215] /ground [214] pads on the device die [21];

selecting a suitable ball grid array package [20] having a ground [205] for the device die [21]; bonding a ground strap [24] to the device die ground pads [216] and the ball grid array package ground [205], coupling the device die ground pads [216] to the ball grid array package ground [205]; bonding signal pads [212], in the vicinity of the ground strap [24], of the device die [21] to ball grid array package landings [203]; bonding remaining signal [212 on other side of 24] and power pads [215] of the device die [21] to ball grid array package landings [203,204]; and sealing the ball grid array package [encapsulated in 25].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 3, 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liao et al. (US 6,570,249) in view of Jacobs et al. (US 4,811,082).

Regarding claim 1, Liao et al. disclose an integrated circuit device comprising:

an integrated circuit having a plurality of grounding pads [Figs. 3A & 3B: semiconductor chip 20], signal pads [Figs. 3A & 3B: bond pads 21 shown later in Fig 4B connected to signal fingers 11, therefore carry a signal], and power pads [Figs. 3A & 3B: bond pads 21 shown later in Fig 4B connected to power ring 12, therefore power lines]; and a package for mounting the integrated circuit [Figs. 3A & 3B: semiconductor chip 20 mounted on substrate 10]; wherein the package comprises, a grounding ring surrounding the integrated circuit [Fig. 3B & 4B: substrate 10 has a ground ring 13 that surrounds the semiconductor chip 20]; and bonding wires coupling the grounding ring to the corresponding grounding pads of the semiconductor chip. Liao et al. does not disclose a mounting strap coupling the grounding ring to the grounding pads of the integrated circuit. Jacobs et al. does disclose a mounting strap coupling an electrical component located above and disposed on another electrical component [Fig. 1: 9 disposed on 8 are electrically connected by decal 29, column 13: 7-30 shows that the decal carries a ground line, "Thin film wiring is typically embedded in the dielectric, the wiring basically comprises signal wiring 35 and ground lines 41..."]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a signal tape connecting the ground pads of the chip to the grounding area of the substrate. The ordinary artisan would have been motivated to use the signal tape in order to minimize the use of bonding wires, which are extremely fragile and prone to breakage during manufacture and specifically during the application of the protective molding. It is also noted that the use of a grounding ring is well known in the art, and

further is disclosed as being well known or "commonly used" (lines 15 and 16 of Page 1 of the specification).

Regarding claim 2, Liao et al. and Jacobs et al. disclose the system of claim 1. In addition, Liao et al. further discloses that the package further comprises a plurality of pad landings [Figs. 3B & 4B: substrate 10 has a plurality of signal fingers 11].

Regarding claim 3, Liao et al. and Jacobs et al. disclose the system of claim 2. In addition, Liao et al. discloses wherein the signal pads of the integrated circuit are coupled to the pad landings with bond wires [Fig. 4B: several bonding pads 21 connect to the signal fingers 11 by bond wires 30].

Regarding claims 10 and 13, Liao et al. and Jacobs et al. disclose the integrated circuit device of claims 1 and 2. In addition, Jacobs et al. disclose the grounding strap further comprises, a first conducting material providing a first conductor and having a first length and a first cross-section, the first conductor having a top surface and a bottom surface [Fig. 1: 29, 31 with lines 35, column 13: lines 6-21, "...thin film lines 35 in decal 29,31 interconnections. The decals 29, 31 are made of a low dielectric flexible material..." so thin film lines are the first conducting material which have a length and would have a first cross section, and a top and bottom surface since it is a flat tape bonding connection].

Regarding claims 11 and 14, Liao et al. and Jacobs et al. disclose the integrated circuit device of claims 10 and 13. In addition, Jacobs et al. does disclose that the conductive strap further comprises, a dielectric material having a second cross-section and a second length, the second cross-section being about equal to the first cross-

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section of the first conductor, the second length shorter than the first length, the dielectric material being attached to the first conductor at about the midpoint of the first length, leaving a first gap and a second gap of the first conductor exposed [Fig. 1, magnified below: shows the electrical conductor 35 with a length longer than the dielectric portion below it, labeled by the examiner as B, with a gap for the via connects A and C to externally connect line 35].

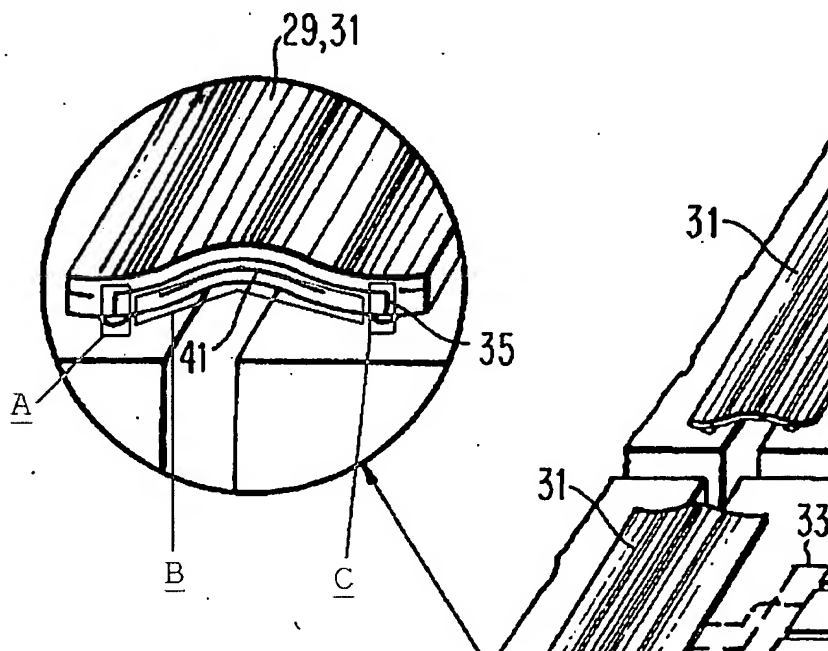


Figure 1, Jacobs, magnified to show the tape structure.

Regarding claims 12 and 15, Liao et al. and Jacobs et al. disclose the integrated circuit device of claims 11 and 14. In addition, Jacobs et al. disclose the grounding strap further comprises, a second conducting material applied to the first conductor at the first gap and the second gap, the second conducting material applied so that the second conducting material is substantially flush with the dielectric material; and wherein the mounting strap is formed in a manner so that the first gap couples one

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components bonding area to another components bonding area, which includes providing a ground connection (the ground pad of the integrated circuit being connected with the ground ring of the substrate, already having been rejected in claim 1) [Fig. 1, magnified below: shows the electrical conductor 35 with a length longer than the dielectric portion below it, labeled by the examiner as B, with a gap for the via connects A and C to externally connect line 35, column 13: lines 6-21, "...thin film lines 35 in decal 29,31 interconnections. The decals 29, 31 are made of a low dielectric flexible material..."].

Claims 4 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liao et al. (US 6,570,249) and Jacobs et al. (US 4,811,082) in view of Cloud et al. (US 5,815,427).

Regarding claims 4 and 17, Liao et al. and Jacobs et al. disclose the system of claims 1 and 3. Liao et al. and Jacobs et al. do not disclose wherein the bond wires are in close proximity to, but not touching, the grounding strap. Cloud et al disclose wherein the bond wires are in close proximity to, but not touching, the connecting conductive strap [Fig. 1: module 18 with pad 28, having wire 34 connected to it, and beside pads 28 that provide a bonding area for tape 32 with conductors 30 therein]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a signal tape in conjunction with bonding wires. The ordinary artisan would have been motivated to do so in order to provide the utmost in flexibility in wiring / connection options, but at the same time minimize the use of the highly fragile bonding wires.

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Claims 5, 6, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liao et al. (US 6,570,249) and Jacobs et al. (US 4,811,082) in view of Notani et al. (US 5,349,317).

Regarding claim 5, 6, 8, and 9, Liao et al. and Jacobs et al. disclose the system of claim 1. Liao et al. and Jacobs et al. do not disclose wherein the grounding strap comprises copper conductors. Notani et al. does disclose a conductive strip tape comprises copper conductors [column 4: lines 15-25 shows that conductive lines are either copper, gold, or aluminum]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use copper, gold or aluminum as the conductor in the conductive element. The ordinary artisan would have been motivated to do so in order to utilize an industry standard metal known for its high performance characteristics.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liao et al. and Jacobs et al. in view of Grellman et al. (US 4,600,907).

Regarding claim 7, Liao et al. and Notani et al. disclose the system of claim 1. Liao et al. and Notani et al. do not disclose wherein the grounding strap comprises silver conductors. Grellman et al. disclose the grounding strap comprises silver conductors [column 4: lines 48-51]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use silver conductors. The ordinary artisan would have been motivated to use silver conductors since silver is well known in the art to be a high quality conductor with one of the highest conductivities of metals and its ability to withstand corrosion and oxidation.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liao et al., Jacobs et al., and Cloud et al. in view of Notani et al. (US 5,349,317).

Regarding claim 16, Liao et al., Jacobs et al., and Cloud et al. disclose the integrated circuit device of claim 4. Only Jacobs et al. disclose wherein the dielectric material is polyimide [column 13: lines 14-17, "The decals are made of a low dielectric flexible material (i.e. preferably polyimide)..."]. Notani et al. does disclose wherein the dielectric material is TEFLON (polytetrafluoroethylene PTFE) [column 4: lines 9-15]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use polytetrafluoroethylene PTFE (trade name, TEFLON). The ordinary artisan would have been motivated to use PTFE in order to provide the well-known anti-friction physical characteristics, which would greatly aid in the application of the tape conductor.

Response to Arguments

Applicant's arguments with respect to claim 18 have been considered but are moot in view of the new ground(s) of rejection.

In response to the arguments to the combination of Liao and Jacobs, it is well known in the art to use Tape Automated Bonding (TAB) to connect device die to package substrates in conjunction with wire bonding (Cloud et al. US 5,815,427 shows the use of TAB in Figure 1, and shows on column 3, lines 20-24, that "the conductors 30 of conventional automated-bonding tape 32, or other conventional coupling means"). Also in regards to the assertion that the combination renders the device of Liao and Jacobs "inoperable", since there are no specific connection orientations just general use

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of a TAB to connect generally a ground pad of a chip to a ground ring of a package substrate.

Fax / Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eduardo A. Rodela whose telephone number is (571) 272-8797. The examiner can normally be reached on M-F, 9:00AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eduardo A. Rodela
Examiner

